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GAS ABSTRACTS

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1. GAS INDUSTRY

Accident Prevention

Brown, W. F. PRINCIPLES OF ACCIDENT PREVENTION. Paper presented to the A.G.A. Joint Production and Chemical Committee Conference, Asbury Park, N. J., May 24-26, 1948.

Beginning with a brief history of organized accident prevention, Mr. Brown explains and describes the interest and movement of safety as an integral part of the management operating program supported by the American gas industry. In the following order are emphasized responsibilities of management, costs, experiences, records, training, plant layout and design, and finally, plant safety committees. Mr. Brown believes safety to be "emblematic of an economic, patriotic and humanitarian work being practiced by decent people everywhere."

E. M. Rueck

Synthetic Fuels Laboratories

GOVERNMENT OPENS $3,500,000 SYNTHETIC FUELS LABORATORIES AND PILOT PLANTS AT BRUCETON, PA. *Ind. Heating* **15**, 1296-1300, 1302, 1304, 1306, 1308, 1310 (1948) *August.*

Located at Bruceton, 13 miles south of Pittsburgh and equipped at a cost of $3,500,000, the Synthetic Liquid Fuels Laboratory is the largest and best equipped in this field of research. Two basic processes are being studied —Fischer-Tropsch synthesis and Bergius coal hydrogenation. One building, three stories high, contains a catalyst preparation room, a catalyst testing laboratory, and special instruments, such as a mass spectrometer, infra red and ultra-violet spectrometers and X-ray diffraction. This building designed for study of the Fischer-Tropsch synthesis, also has a 60x120 ft pilot plant area, two and three stories high. The largest building, three stories high, 301 ft long by 70 ft wide, houses the Bergius research. Since this work involves operation at 3,000 to 10,000 psi and temperatures of 850-1000°F, an explosion-proof pilot plant area, 200 ft by 23 ft, has been created by installation of a steel-reinforced concrete wall, 55 ft high. This area is divided into 4 bays by one-foot thick concrete walls. Within the bays are steel and concrete stalls for the reactors. An explosion-protected control room is maintained under positive pressure. Special shops, catalyst preparation and laboratories for small scale studies are also in this building. A third building, the central administration building, houses the administrative staff, cafeteria, service shops, stockroom and drafting room. A gas plant at the rear of the six acre tract can produce 110,000 cu ft of hydrogen and 120,000 cu ft of synthesis gas daily.

C. H. Riesz

2. APPLIANCES

Burners

Dudley, C. C. BURNER ADJUSTMENT. *Butane-Propane News* **10**, 118, 121-122, 125 (1948) *September.*

A description of the adjustment and operation of gas burners is given.

E. F. Davis

Smith, A. Q. GAS CONVECTION HEATING CURES AUTOMOTIVE FINISHES AT BRIGGS MANUFACTURING CO: II. *Ind. Heating* **15**, 1557-1558, 1560, 1562, 1564 (1948) *September.*

A discussion of the burner equipment and controls employed in the drying ovens is given.

E. F. Davis

LP-Gas Burners

Clifford, E. A. HOW TO DETERMINE LP-GAS BURNER CAPACITIES. *LP-Gas* 8, 29-31, 71 (1948) *September.*

In part two of this series the author discusses the method of determining burner capacities based on low flame pressure. A chart is also included for determining orifice sizes as well as bypass orifice sizes for range ovens.

E. F. Davis

Ray, P. A. VELOCITY REDUCING HOOD ORIFICES. *Gas* 24, 42-44 (1948) *September.*

In order to reduce the primary air inspiration when using propane-air in gas burners it was found desirable to change to hood orifices. Charts are shown which show the proper hood depth for proper burning.

E. F. Davis

Space Heating

Konzo, S. and Roose, R. W. PANEL HEATING OR CONVECTION. *Gas* 24, 52-54 (1948) *September.*

Results of tests conducted to compare the radiant panel heating system with the conventional warm air system are reported. Indications are that there is little difference in the two systems.

E. F. Davis

The following articles, which have not been abstracted, are called to your attention:

Harris, F. E. NEEDS IN FURNACE DEVELOPMENT AND FUEL UTILIZATION FOR THE METAL INDUSTRY. *Ind. Heating* 15, 1514, 1516, 1518, 1520, 1522, 1524, 1526, 1528, 1538 (1948) *September.*

Young, C. C. GAS-OIL BURNER PROVIDES NEW PROTECTION FOR HOMES THAT ARE HEATED WITH GAS. *Am. Gas J.* 169, 34-36 (1948) *September.*

3. COMBUSTION AND INDUSTRIAL FURNACES

Furnaces

McClatchey, H. E. COMPARISON OF SYSTEMS FOR CONTROLLING GAS-FIRED FURNACE PROCESS TEMPERATURE. *Petroleum Processing* 3, 878-880 (1948) *September.*

Comparisons of three flow control systems for gas fired furnaces indicate that the "pressure balanced" control valve is most practical because of low first cost and low maintenance.

E. F. Davis

Stanbery, L. J. and Brennan, J. M. RAPID BILLET HEATING WITH GAS. *Iron Age* 162, 82-85 (1948) *August* 26.

A newly developed forging billet heating furnace which heats work to 2200° to 2300°F at a rate of up to 440 pieces per hr with a minimum of oxidation is described in this article. Containing a number of unusual design features, including water-cooled skidway rails, the furnace is said to have a normal refractory life. Construction, heating rates, atmospheres, controls, operating costs and furnace life are discussed.

Authors' abstract

4. CARBONIZATION AND GASIFICATION

Coal Drying

Kramers, W. J. and McKee, J. H. THE DRYING OF COAL. *Bull. Brit. Coal Utilization Research Assoc.* 12, 157-175 (1948) *May.*

The use of water for underground dust suppression and wet processes for coal cleaning normally result in a product requiring dewatering or drying before utilization. A very complete summary is presented of performance of various processes for dewatering by non-thermal, thermal, and pneumatic methods including screen and plate dewaterers; single-, double-shell, and louvre rotary driers; turbine, Fleissner, and turbine vertical driers; and air-swept pulverizing mill and Kestner thermoventuri pneumatic driers.

C. Von Fredersdorff

Coal Properties

Bingham, D. H. and Franklin, R. E. THERMAL EXPANSION OF COALS AND CARBONIZED COALS. *Trans. Faraday Soc.* (British) 42, 289-295 (1946).

Thermal expansion measurements on several grades of bituminous coal and anthracite in the form of rod-shaped monoliths or cold pressed artefacts indicated (1) adsorbed films (such as water or hydrocarbon vapors) on the surface of the coal particles resulted in a relatively large expansion coefficient on initial heating; (2) reproducible thermal expansion coefficients were obtained after vaporization of surface films, the coefficient then being practically independent of preheat temperature below 300°F; (3) reproducible expansion coefficients for two bituminous coals tested were independent of rank, whether monolith or artefact, pressure applied during fabrication of artefacts, and orientation with respect to bedding plane of monoliths; (4) expansion coefficients decreased markedly although still temperature-dependent after treatment by preheating above 325°C; and (5) volume coefficients at carbonizing temperatures (obtained from linear expansion) were far below the value reported for macrocrystalline graphite. The apparatus used in the experiments consisted of a silica optical-lever extensometer with mirror arrangement so that readings of extension could be focussed on a scale capable of a 5000 magnification.

C. Von Fredersdorff

Franklin, R. E. A NOTE ON THE TRUE DENSITY, CHEMICAL COMPOSITION AND STRUCTURE OF COALS AND CARBONIZED COALS. *Fuel* (British) 27, 46-49 (1948) *May-June.*

The true specific volume of coals is shown to be a linear function of the hydrogen content, and the density of a hypothetical coal of zero hydrogen content is considerably lower than that of graphite. This indicates that there is a fundamentally similar molecular structure in a wide range of different coals and that it is markedly different from that of graphite. The true density of various carbonized coals is shown to be primarily dependent on the maximum carbonization temperature.

Author's abstract

Distribution

Holtam, A. G. A METHOD OF REMOVING DUST FROM GAS MAINS. *Gas Times* (British) 56, 225-226 (1948) *August* 13.

See *Gas Abstracts* 4, 146 (1948) *August* for abstract.

Young, D. S. AUTOMATIC CONTROLS IN GAS DISTRIBUTION. *Gas World* (British) 129, 264-268 (1948) *August* 21.

A discussion is given of methods of automatically controlling gas main pressures thereby reducing the amount of unaccounted-for gas.

E. F. Davis

Gas Purification

Pexton, S., Dougill, G. and Ravald, L. A. THE REMOVAL OF TAR, NAPHTHALENE AND AMMONIA FROM GAS. *Gas World* (British) **129**, 215-226 (1948) *August* 14.

See *Gas Abstracts* 4, 147 (1948) *August* for abstract.

Oxygen Manufacture

Downs, C. R. IMPACT OF TONNAGE OXYGEN ON AMERICAN CHEMICAL INDUSTRY. *Chem. Eng.* **55**, 113-117, 121 (1948) *August.*

The author briefly describes the method of manufacture of oxygen in large quantities, lists the companies which are building oxygen plants at the present time, and presents estimated plant and operating costs. The author then speculates on the effect that low cost oxygen would have on the production of liquid fuels, the production of iron and steel, the roasting of sulfide ores, the manufacture of city gas and the production of chlorine.

W. J. Merwin

Van Dyke, B. H. NEW COMMERCIAL TONNAGE OXYGEN SYSTEM. *Steel* **123**, 103-104, 134, 136, 140, 143, 146 (1948) *September* 20.

A unique 5 ton per hr oxygen plant developed by Elliott Company utilizes an atmospheric pressure distillation system combined with a nitrogen liquefaction and refrigerating system, resulting in such features as: (1) no periodic shutdowns for deriming are required, (2) the system is immune from dangerous concentrations of acetylene, and (3) operation at reduced loads is possible without sacrificing efficiency. A 97% recovery of the oxygen in the air charged to the system is obtained. Nitrogen leaving is over 99.5% pure while oxygen of any purity, ranging from 95 to 99.5% is produced.

C. Von Fredersdorff

Peak Load Gas

Faber, W. F. THE DAYTON-FABER OXYGEN OIL GAS PROCESS FOR CITY APPLICATION. Paper presented at the American Gas Association Joint Production and Chemical Committee Conference, Hotel Berkeley-Carteret, Asbury Park, New Jersey, May 24-26, 1948.

The process and apparatus used in a pilot plant study for producing oxygen oil gas with a heating value of 500-1100 Btu are described. Tables showing operating data and predicted operating costs for plants of various capacities from 2000 to 12000 Mcf per day are included. The author states that the investment and operating costs are low. The construction of a complete Dayton-Faber Process plant including oxygen plant, having a capacity of two million cu ft per day of 540 Btu gas is estimated to cost approximately one half of a modern heavy oil carburetted gas plant of equal capacity. Labor requirements are also about half when compared with a modern water gas plant. Sulfur purification cost is low because of the low hydrogen sulfide content of the finished gas. Furthermore the process is continuous and will produce a gas of any desired heating value from 500 to 1100 Btu.

S. A. Olund

Lamb, F. P. HIGH BTU OIL GAS PRODUCTION. Paper presented at the A.G.A. 1948 Joint Production and Chemical Committee Conference, Asbury Park, N. J., May 24-26, 1948.

The conversion from 600 Btu mixed gas to straight 1100 Btu natural gas in the Washington area during 1946 and 1947 is discussed. A study showed that the production of high Btu oil gas with oil firing for supplementing the peak demand would be most economical since much of the equipment for that type of operation was available. After preliminary tests on a 52 inch generator and 36 inch carburettor water gas set and an automatically controlled 12 ft x 12 ft x 12 ft water gas set, both converted to high Btu oil gas production, it was found that the requirements could be met by converting 14 sets at the East Station

plant. Typical operating data are given and the performance of the equipment is discussed.

H. R. Linden

Maccormac, M. PRODUCTION OF PEAK LOAD GAS BY THE PARTIAL COMBUSTION OF OIL. *Gas J.* (British) 254, 485-488, 491 (1948) *June* 2.

A process for production of oil gas by incomplete combustion of preheated gas oil in preheated air as well as the mechanism of combustion of hydrocarbons is discussed. The variables of absolute pressure and fuel-air ratio are shown to be controlling in the formation of "normal", "cool" and "cracking" flames, with the cracking flame the only one suitable for gas production. A pilot plant using a 12″ I.D. generator was capable of generating 4500 cu ft/hr of gas with a specific gravity of approximately 1.0 and heating values between 400 and 550 Btu depending on the oil to air ratio and the oil and air preheat. Oil efficiencies of 100,000 Btu per gallon of 35° API gas oil and tar yields of 40% by volume were obtained.

H. R. Linden

Reforming

Kearby, K. K. CATALYTIC REFORMING OF HYDROCARBONS. U.S. 2,447,016 (1948) *August* 17.

By combining molecular proportions of zinc oxide and aluminum oxide, a spinel, $ZnO.A1_2O_3$, is formed. This material was found to be not only more heat stable than alumina but also produced more active catalysts. Thus, chromium or molybdenum oxide catalysts on a zinc aluminate spinel carrier were highly active for the aromatization of naphthenic or paraffinic hydrocarbons. Spinels formed between aluminum oxide and magnesium oxide, cadmium oxide, copper oxide, calcium oxide, beryllium oxide or manganese oxide produced catalysts of much lower activity.

C. H. Riesz

Zeiger, H. E. and Roberts, W. W., Jr. SEND-OUT GAS NOMOGRAPH. *Gas Age* 102, 11, 48, 50 (1948) *September* 2.

Two alignment charts were constructed to make possible the rapid determination of the amounts of furnace flue gas or air, propane and carrier gas produced by steam reforming of propane necessary to give a mixture of specified heating value and specific gravity. Other possible uses of the charts are to find the heating values of various combinations at a fixed specific gravity and to find the specific gravities possible with a given heating value.

S. G. Dean

Synthesis Gas Production

Reed, R. M. and Eriksen, A. HYDROGEN AND SYNTHESIS GAS PRODUCTION. *Calif. Oil World* 41, 3, 5, 7, 9, 11 (1948) *August*, 2nd issue.

The hydrocarbon-steam process for the production of hydrogen and mixtures containing carbon monoxide and hydrogen is described briefly. Current application of the process is in ammonia synthesis, oil hydrogenation, anhydrous hydrogen chloride, synthesis of organic chemicals, liquid fuels synthesis and as a substitute or supplement for manufactured gas. Indicative of fuel gas mixtures obtainable by the process is the generation from propane of a gas with 298 Btu/cu ft heating value and 0.36 specific gravity. Blended with propane, a gas of 540 Btu/cu ft heating value and 0.49 specific gravity can be obtained.

C. H. Riesz

5. NATURAL GAS AND NATURAL GAS CONDENSATES

Acidizing

Moore, J. H. and Adams, J. W. SHORT INTERVAL ACID TREATING TECHNIQUE. *World Oil* 128, 126-128, 130 (1948) *September.*

Selective acidizing at different levels is desirable due to variations in permeability of the pay zone. A method involving packers is described.

J. D. Parent

Villines, E. S. SELECTIVE ACIDIZING AT HUGOTON. *World Oil* 128, 76-77 (1948) *September.*

Considerable acidizing of wells is now being done in the Hugoton field. Methods for selectively treating different pay zones are presented.

J. D. Parent

Cycling

Jordan, L. L. SECONDARY RECOVERY ADDS TO ARKANSAS RESERVES. *World Oil* 128, 121-124 (1948) *September.*

Secondary recovery has added to recoverable oil and increased the rate of production at four pools in Arkansas.

J. D. Parent

Robertson, W. T. and Stamper, H. M. KATY GAS-CYCLING PLANT. *Oil Gas J.* 47, 64-67 (1948) *September* 9.

458 MMcf/day wet gas is treated and 80% butanes are recovered. A variety of liquid products as light as a methane-ethane-propane mixture and as heavy as a heavy naphtha are produced. Operating data are given. Excellent flow diagrams are given including one for the power plant.

J. D. Parent

Gasoline Plant

Albright, J. C. NATURAL GASOLINE PLANT INCREASES OUTPUT BY USING PROPANE REFRIGERATION UNIT. *Petroleum Processing* 3, 867-868, 871-872 (1948) *September.*

Propane chilling permits more complete recovery of gasoline. Chilling of the gas leads to greater capacity. Chilling oil to the absorber from the usual water cooler 25°F leads to 5% greater gas capacity and 16.5% greater gasoline recovery. A flow sheet for the propane chilling unit is given.

J. D. Parent

Pryor, C. C. INCREASED ECONOMY AT TOMOCONNOR. *Petroleum Refiner* 27, 104-107 (1948) *September.*

A quantitative flow sheet is given for the Tomoconnor gasoline plant; 55% propane recovery is realized and 26Mcf/day of casing-head gas which had previously been flared is treated.

J. D. Parent

LP-Gas

Bolander, G. [ABOVEGROUND] TANKS. *Butane Propane News* 10, 190-192, 194, 196, 198, 200 (1948) *September.*

In the first part of a series of two articles, the author points out that 160 Btu must be supplied from the atmosphere for each pound of propane evaporated. He then states that in extremely cold weather, one regulator may not be able to supply the demand, and consequently, another one should be placed in parallel. He cautions that a tank should be properly sized for a given load so that enough heat can be absorbed from the atmosphere for vaporization purposes.

W. J. Merwin

Garretson, O. L. WHICH GAS IS TODAY'S CHOICE? *LP-Gas* 8, 37-39 (1948) *September.*

For the long term trend propane is the better supply bet. But for the near future butane supplies will allow considerable southern and southwestern expansion. Mr. Garretson also analyzes some cost accounting differences between propane and butane operations.

Author's abstract

Mattocks, E. O. USE OF UNFIRED PRESSURE VESSELS IN LP-GAS INDUSTRY. *Butane-Propane News* 10, 43-49 (1948) *July.*

The author points out that containers for LP-gas for railroad transport are built according to specifications of the ICC, but that containers for tank trucks and for large storage are built according to the ASME, or the API-ASME code. The physical properties of the hydrocarbons composing LP-gas are listed. The author then mentions that the design pressure for storage vessels is determined by the temperature of the contents of the vessel.

W. J. Merwin

Mattocks, E. O. USE OF UNFIRED PRESSURE VESSELS IN LP-GAS INDUSTRY. Part 2. *Butane-Propane News* 10, 61-69 (1948) *August.*

Data are presented on the temperatures of liquid and vapor propane in storage together with the pressure on the tank and the quantity stored. It was apparent that liquid temperatures above 90°F rarely occur, and hence 100°F was established as the temperature for determining the maximum vapor pressure which might be encountered in ordinary storage. The vessels are usually designed with a safety factor of 5 based on the ultimate strength. Experience has shown that an internal corrosion allowance is not necessary.

W. J. Merwin

Mattocks, E. O. USE OF UNFIRED PRESSURE VESSELS IN LP-GAS INDUSTRY. PART 3. *Butane-Propane News* 10, 100-103, 106, 109-110, 113-114, 116 (1948) *September.*

Safety valves are placed on LP-gas tanks to protect the tank from over-pressure caused by an external fire, overfilling the tank or by using it for a substance of higher vapor pressure than that for which it was intended. The safety valves used must not allow any leakage below the set pressure and hence soft seats are usually installed in the valves. The Fetterly equation for computing the size opening required in the safety valve is presented.

W. J. Merwin

Thoes, D. TRANSFER OF LP-GASES. *Butane-Propane News* 10, 168, 171-172, 174, 176 (1948) *September.*

LP-gases are transferred by creating a differential pressure, either by heating one container, by using an inert gas at higher pressure on one container, by having a difference in elevation, or by pumping. The use of air or oxygen as the inert gas is warned against. In pumping the material, two rules are given: (1) do not try to pump more liquid than you can get through the suction line with the available head, and (2) do not allow heat to enter the suction line between the pump and the storage tank.

W. J. Merwin

CENTRAL PLANTS SAFE DESIGN AND OPERATION. *Butane-Propane News* 10, 85-86, 88, 91-92, 95-96, 99 (1948) *September.*

Certain aspects of design of central stations for handling LP-gas are considered. Briefly they are as follows: liquid storage, vaporization, mixing, gas storage, and distribution.

W. J. Merwin

Pipe Lines

Chabre, G. and Millen, J. A. NITROGEN PURGING OF PIPELINES AND REPAIRS THROUGH CONTROLLED FIRE. *Gas* 24, 55-59 (1948) *September.*

A purging procedure for pipelines is given. The use of a slug of inert gas as a protective barrier between air and gas is advocated. Controlled fire during welding repairs is also discussed.

J. D. Parent

Fletcher, B. J. WELDED ALUMINUM ALLOY PIPE LINES. *Oil Gas J.* 47, 207-208, 211, 301-302, 304 (1948) *September* 23.

The author feels that the relative price of aluminum and steel is sufficiently favorable to permit the use of aluminum line pipe. Welding technique has advanced in recent years to the point where field welding is reasonably easy. Types 61S-T6 and 63S-T6 are recommended as corrosion resistant.

J. D. Parent

Goodrich, B. D. CONVERSION OF PIPE LINES FROM OIL TO GAS TRANSMISSION. *Mech. Eng.* 70, 733-737 (1948) *September.*

The history of the adaptation of centrifugal compressors to use on the Texas Eastern lines is given.

J. D. Parent

Peifer, N. P. and Costanzo, F. E. RECENT DEVELOPMENTS IN CATHODIC PROTECTION OF PIPE LINES. *Gas Age* 102, 21-23 (1948) *August* 5.

Two refinements in cathodic protection of bare underground steel pipe are discussed. The first is the use of expendable ribbon type magnesium and the second is the refinement of the method of determining the need and calculating the current density required for protection. The new type of test for determining the current densities of the anodes and cathodes on buried pipe lines was examined under controlled conditions and the results are reported.

B. E. Hunt

Reed, P. TODAY'S NATURAL GAS CONSTRUCTION METHODS IN LAYING 26 AND 30-31-IN. PIPE LINES. *Oil Gas J.* 47, 180-184, 188 (1948) *September* 23.

Modern techniques such as X-ray inspection of welds, radio communication and use of electrically operated internal line-up clamps are briefly discussed.

J. D. Parent

Purification

Campbell, D. L. SEPARATION AND PURIFICATION OF GASES. U.S. 2,446,076 (1948) July 27.

A continuous process and apparatus for the segregation and purification of gases by selective adsorbents is claimed. The adsorbent material is fluidized in the stream of gases to be treated and this mixture is passed through an appropriate treating zone. Provision is made for regenerating the used adsorbent so that it may be recycled to the treating system. Application of the process to removal of H_2S, CO_2, CO, butadiene, and alcohol vapors is suggested to illustrate uses to which it could be put.

H. Hakewill

TREATING UNITS ELIMINATE H_2S FROM PROCESS GAS. *Petroleum Refiner* 27, 117-119 (1948) *August.*

A purification plant for the removal of H_2S and mercaptans from sour casinghead gas is described. The gas (having an H_2S content of 95 grains per 100 cu ft) is processed, after purification, to liquid products that pass the No. 1 copper strip test. Treatment with sodium carbonate, caustic wash, cupric chloride, and absorption oil in countercurrent scrubbing towers is utilized to effect the reduction of H_2S and mercaptan sulfur. Operation data and a flow diagram of the plant are included.

H. Hakewill

Recovery

Louden, E. W. LOST CIRCULATION OR LOST RETURNS. *World Oil* 128, 85, 88-91, 93-94 (1948) *September.*

Lost mud circulation and means of recovery are discussed.

J. D. Parent

Storage

Meiller, D. V. NATURAL GAS STORAGE IN UNDERGROUND PIPE SECTIONS. *World Oil* 128, 171-172, 174, 176 (1948) *September.*

The storage project of Public Service of Northern Illinois is described. Cost and engineering data are given.

J. D. Parent

UNDERGROUND STORAGE OF NATURAL GAS AND PROPANE. *Am. Gas J.* **169**, 29-30 (1948) *September.*

Michigan Gas Storage Company, a subsidiary of Consumers Power Company, is engaged in storing gas underground in Clare County, Michigan. A 1000 Btu per cu ft mixture of propane, air and natural gas is being stored. Twelve hundred tank cars amounting to 12 million gallons of propane will be converted into the equivalent of 1000 MMcf of natural gas. More propane will be received during the winter. Propane from both natural and refinery sources is being used.

J. D. Parent

Transmission

Beale, E. S. L. and Docksey, P. ALLOWANCE FOR LOSSES DUE TO EXIT, ENTRANCE, AND FITTINGS FOR A GAS FLOWING IN A PIPE UNDER HIGH PRESSURE DROP. *J. Inst. Petroleum* (British) 34, 602-609 (1948) *August.*

The usual isothermal flow formula for gases considers only friction losses between two points in the line. Kinetic energy changes may also be included. The purpose of this paper is to indicate how to properly allow for losses in fittings and losses at the entrance and exit points in a line.

J. D. Parent

Miller, B. GAS TRANSPORTATION SYSTEM CALCULATIONS. *Gas Age* **102**, 21-26 (1948) *September* 2.

The elementary theory of axial flow compressors is presented.

J. D. Parent

Stovall, E. E. HIGH PRESSURE GAS MEASUREMENT. *Gas Age* **102**, 27-32, 62, 64 (1948) *August* 19.

Problems involved in high pressure gas measurement are discussed and the need for new data similar to that covered for lower pressures in the AGA Measurement Committee Report No. 2 is pointed out.

J. D. Parent

Unitized Field

McCaslin, L. S., Jr. NATION'S LARGEST VOLUNTARY UNIT FORMED ON TEXAS GULF COAST. *Oil Gas J.* **47**, 84-86, 120, 123, (1948) *September* 16.

Old Ocean field in Texas has become the largest voluntarily unitized oil and gas field. Details of the plan of operation and participation are given.

J. D. Parent

6. PETROLEUM AND SYNTHETIC LIQUID FUELS

Alkylation

Shreve, R. N. ALKYLATION. *Ind. Eng. Chem.* 40, 1565-1574 (1948) *September.*

Developments in the unit process alkylation are reviewed for the period 1941 through 1947. The method of bonding the alkyl group into the molecule is used as the basis of classification, namely alkyl bonded to oxygen, alkyl bonded to nitrogen (both tertiary and quaternary), alkyl bonded to carbon, and alkyl bonded to other elements (principally metals). Production of ethylbenzene as an intermediate in styrene production and "alkylate" as high octane fuel for internal combustion engines are outstanding uses of the process during the period covered. 157 references are given.

C. H. Riesz

Hydrocarbon Synthesis

Layng, E. T. SYNTHESIS OF HYDROCARBONS WITH SULFUR CONTAINING CATALYST. U.S. 2,446,426 (1948) August 3.

Sulfur or compounds of sulfur are added in amounts sufficient to suppress the formation of CO_2 but not enough to inhibit substantially the yields of liquid hydrocarbons. The sulfur may be incorporated in the catalyst or contained in the synthesis gas. If the sulfur content of the catalyst becomes excessive, hydrogen treatment effects removal in the form of H_2S.

C. H. Riesz

Pyrolysis

Haensel, V. and Sterba, M. J. PYROLYSIS OF HYDROCARBONS. *Ind. Eng. Chem.* 40, 1660-1670 (1948) *September.*

The pyrolysis of hydrocarbons is reviewed for the period 1940 through 1947. Development of the Polyform process is the most prominent development in thermal cracking. However, the appearance and wide acceptance by the petroleum industry of catalytic processes of various types is typified by the following five major developments: Houdry fixed bed process, Thermofor (TCC) process, fluid catalytic cracking, suspensoid process and cycloversion. Catalytic reforming of low octane number naphthas in the presence of hydrogen (hydroforming) and catalytic dehydrogenation of light hydrocarbon gases are also outstanding advances. Improved catalysts have aided in the progress of catalytic processing. Formation of catalysts in the shape of microspheres is an important development. 184 references are given.

C. H. Riesz

TPC Process

Eastwood, S. C. and Potas, A. E. THERMOFOR PYROLYTIC CRACKING PROCESS. *Petroleum Engr.* 19, 43-46 (1948) *August.*

The Thermofor Pyrolytic Cracking (TPC) process is essentially a modification of the TCC process. In the TPC process pebbles are substituted for catalyst, and the pebbles are preheated to the desired temperature by direct combustion of fuel gas in the pebble bed. Pebble preheat temperature may be as high as 1800°F. Tables are given showing conditions and yields obtained when using the TPC process for the production of olefins and aromatics.

W. J. Merwin

The following article, which has not been abstracted, is called to your attention:

Foster, A. L. HYPERSORPTION. *Oil Gas J.* 47, 90, 93-94, 97, 99, 100 (1948) *August* 12.

7. ANALYTICAL METHODS AND TESTS

Aromatics Determination

Conrad, A. L. DETERMINATION OF AROMATIC COMPOUNDS IN PETROLEUM PRODUCTS. *Anal. Chem.* 20, 725-726 (1948) *August.*

A rapid chromatographic method for the determination of aromatic compounds in hydrocarbon mixtures in the gasoline and kerosene range utilizes a combination of silica gel separation and ultraviolet-stimulated fluorescence. The method is reproducible to within ±2% and requires a maximum of 45 minutes per determination. Olefins and other hydrocarbons do not interfere.

Author's abstract

Carbon Monoxide Detection

Minchin, L. T. FIELD TESTS FOR THE DETECTION OF CARBON MONOXIDE. *Chem. & Ind.* (British) 1948, 147-149 *March* 6.

Several methods for detecting and approximating carbon monoxide are presented. One is the iodine method which depends on the liberation of iodine vapor from iodine pentoxide. Another method utilizes the "hopcalite" catalyst (a mixture of copper, manganese, cobalt and silver oxides). In this method an apparatus is designed to measure the heat generated by the oxidation of CO to CO_2 over the catalyst. In a recent development red mercuric oxide is employed, mercury being liberated when the oxide is exposed to CO at 200°C. The liberated mercury is measured by the stain produced on a strip of paper impregnated with selenium sulfide. Another oxidizing agent similarly used is argentic oxide, which reacts readily with CO at room temperature. Palladium methods depend on the reduction of palladous salts by CO. A calibrated double aspirator for drawing gas samples through various detecting devices at a steady rate is described.

M. C. Miyaji

Dewcel

Munch, R. H. INSTRUMENTATION. *Ind. Eng. Chem.* 40, 67A-68A (1948) *August.*

Operation and application of the Dewcel, one of the newer devices on the market for measuring dew point, is briefly discussed. The instrument functions by bringing a saturated solution of lithium chloride to such a temperature that the partial pressure of water of the solution is equal to the partial pressure of water around the Dewcel. Dew points below ordinary room temperature are measured without employing a cooling medium, and dew points ranging from — 16° to ± 160°F may be determined within specified ambient temperature limits. Response is rapid, making the unit adaptable to automatic control applications.

H. Hakewill

Moisture in Coal

Ohlsson, O. THE MOISTURE CONTENT OF COAL AND ITS DETERMINATION. *Fuel* (British) 27, 43-45 (1948) *May-June.*

A study of three methods for determining the moisture content of coal was made. Comparison of the results obtained by oven drying, tube drying, and xylene distillation revealed that the test conditions had an important influence upon the release of moisture from coal. Highest moisture values were obtained by the distillation method. It was found that many coals undergo appreciable oxidation when heated for several hours at 105°C, and that some dried coals possess desiccating properties exceeding those of calcium chloride. Since most of the water of hydration and crystallization present in coal is only removed at temperatures that give

rise to decomposition of the coal, it was concluded that none of the three methods investigated were suitable for the exact determination of water in coal.

H. Hakewill

Olefin Determination

Mapstone, G. E. and Beckman, P. DETERMINATION OF OLEFINS IN CRACKED GASES. *Petroleum Refiner* 27, 112-116 (1948) *August.*

A study of the absorption of olefinic constituents in refinery gases was carried out in an effort to find a reagent and procedure that would effect complete removal of higher olefins with reasonably brief contact time without dissolving ethene, butane and other non-olefinic gases. As a result of this study a modified method was evolved for the determination of higher olefins and ethene. The procedure developed requires analyses of two portions of a gas sample and depends upon the absorption of (1) total olefins in a mercuric sulfate-H_2SO_4 reagent, and (2) higher olefins in 87% H_2SO_4 followed by the absorption of residual ethene in the mercuric sulfate-H_2SO_4 reagent. The difference between total olefins and ethene represents higher olefin content of the gas. This procedure eliminates error due to butane solubility in the 87% H_2SO_4 and is claimed to give accurate and reproducible results.

H. Hakewill

Particle Size Determination

Walton, W. H. FERET'S STATISTICAL DIAMETER AS A MEASURE OF PARTICLE SIZE. *Nature* (British) 162, 329 (1948) *August* 28.

Several methods of defining a statistical diameter of particles are mentioned.

J. D. Parent

Sulfur Determination

Mapstone, G. E. SOME MODIFICATIONS OF THE LAMP METHOD FOR THE DETERMINATION OF SULFUR IN PETROLEUM PRODUCTS. *J. Inst. Petroleum* (British) 34, 486-489 (1948) *July.*

A venturi effect was employed to increase the turbulence in the gases in the combustion zone of sulfur lamps by constricting the lower opening of the chimneys. Highest burning rates and smoothest operation were obtained with chimneys having a 5 to 7 mm. diameter orifice in the base and a 22 to 25 mm. internal diameter. The use of a glass coil between the chimney and absorber was suggested as a means for reducing evaporation losses of absorbent solution. Data are given showing good agreement for sulfur determined in gasoline with burning rates ranging from 5 to 19 grams per hr. For heavy gasoline fractions and kerosene samples it was found that the burning rate could be appreciably increased by surrounding the glass tubing holding the wick with a short length of copper tubing.

H. Hakewill

Thiophene Reactions

Hartough, H. D. COLOR REACTIONS OF THIOPHENE COMPOUNDS WITH CERIC NITRATE ALCOHOL REAGENT. *Anal. Chem.* 20, 860-861 (1948) *September.*

With the exception of 2-nitrothiophene and 2-thiophenecarboxylic acid, thiophene derivatives containing hydrogen or an acetyl group in the *a*-position give color reactions with ceric nitrate alcohol reagent. Derivatives containing halogen or *tert*-butyl groups in both the 2- and 5-positions give no reaction. Of the fifty compounds tested, a few show positional specificity of color, but in general this test cannot be used to distinguish individual thiophene derivatives.

Author's abstract

8. GENERAL AND PHYSICAL CHEMISTRY

Electron Microscopy

Ellis, S. G. ELECTRON MICROSCOPY. PART I. *Petroleum Refiner* 27, 80-85 (1948) *August.*

The first article in a series of two gives a simplified discussion of this instrument. A consideration of the place of the electron microscope in research is followed by a discussion of effective operating personnel and operating principles. The examination and interpretation of data is followed by a consideration of instrument maintenance. An extensive list of references is included.

S. Katz

PVT Data

Kay, W. B. LIQUID-VAPOR EQUILIBRIUM RELATIONS IN BINARY SYSTEMS. *Ind. Eng. Chem.* 40, 1459-1464 (1948) *August.*

Pressure, temperature, and density relations at liquid-vapor phase boundaries for the ethylene-n-heptane system were experimentally determined for a series of mixtures varying in composition from nearly pure ethylene to nearly pure heptane. Temperature composition diagrams of the coexisting liquid and vapor phases at constant pressure were constructed from which equilibrium constants were calculated for ethylene and n-heptane. By comparing the data obtained with previously published data on binary paraffin systems it is concluded that the P-V-T-X relations would be very nearly the same if the ethylene were replaced by a hypothetical paraffin compound of the same boiling point as ethylene.

O. Bloomer

Meyers, C. H. PRESSURE-VOLUME-TEMPERATURE DATA FOR OXYGEN. *J. Research Natl. Bur. Standards* 40, 457-466 (1948) *June.*

A new equation of state of the Kamerlingh Onnes type has been developed for oxygen to include available high pressure data. The equation has been subjected to the standard tests. Pressure-temperature-density data to 150°F and almost 6000 psi are presented in tabular and graphical form.

S. Katz

Spectroscopy

Bloom, E. G., Mohler, F. L., Lengel, J. H. and Wise, C. E. METASTABLE TRANSITIONS IN MASS SPECTRA OF FIFTY-SIX HYDROCARBONS. *J. Research Natl. Bur. Standards* 40, 437-442 (1948) *June.*

The so-called metastable transitions in mass spectra have their origins in the dissociation of ionized particles after passing through the accelerating field but before entering the magnetic field. A consideration of the mass spectra of 56 hydrocarbons has shown the presence of 362 different transitions all of which have been identified.

S. Katz

Collins, R. D. and Newby, M. P. DETERMINATION OF MIXING OF GAS STREAMS BY THE INFRA-RED GAS ANALYZER. *Nature* (British) 162, 224-225 (1948) *August* 7.

A technique developed for use in model experiments on the mixing of air and gas in the open hearth furnace is described. The method gives rapid, highly sensitive response to changes occurring in the furnace atmosphere. The authors believe that the method has application to any problem of turbulent diffusion between streams of similar gases in which mean concentrations of one gas in the other are to be sampled.

H. Hakewill

Hornbeck, G. A. CONTINUOUS SPECTRA AND OH ABSORPTION IN CARBON MONOXIDE-OXYGEN EXPLOSIONS. *J. Chem. Phys.* **16**, 845-846 (1948) *August.*

The use of a succession of explosions in a steel bomb to study the spectrum of the carbon monoxide-oxygen reaction is described. The effect of the CO/O_2 ratio on the intensity of the continuous and the bonded structure is shown, and the study of the OH spectrum in absorption is discussed.

S. Katz

Plyler, E. K. and Humphreys, C. J. INFRARED EMISSION SPECTRA OF FLAMES. *J. Research Natl. Bur. Standards* **40**, 449-456 (1948) *June.*

This is principally a study of the emission spectra of CO_2 and H_2O in flames. To obtain resolution of the CO_2 and H_2O bands, the flame spectra of natural gas and hydrogen are separately analyzed in the region, 1.7-24 microns. In certain regions of the spectrum the intensity of the lines is markedly increased by higher temperatures, obtained by increasing the proportion of oxygen in the mixture. Temperature measurement by determination of the relative intensities of the rotational lines is suggested. For work with flame spectra, a controlled burner, metering fuel and oxygen, is required. The observation of low intensity bands requires a spectrometer of high aperture ratio. However, for most investigations, a moderate order of resolution is satisfactory.

A. J. Rudnitzki

Rasmussen, R. S. VIBRATIONAL FREQUENCY ASSIGNMENTS FOR PARAFFIN HYDROCARBONS: INFRA-RED ABSORPTION SPECTRA OF THE BUTANES AND PENTANES. *J. Chem. Phys.* **16**, 712-727 (1948) *July.*

The infra-red absorption spectra of n-butane, isobutane, n-pentane, isopentane and neopentane are given together with vibrational assignments for these molecules and for propane.

S. Katz

Roberts, R. H. and Johnsen, S. E. J. MASS SPECTRA OF SOME ORGANIC COMPOUNDS. *Anal. Chem.* **20**, 690-692 (1948) *August.*

The mass spectra of 53 organic compounds, including 44 hydrocarbons, 5 oxygen compounds, 2 sulfur compounds, one nitrogen compound and one chlorine compound are reported. The data are presented in tabular form in terms of mass and peak ratio.

S. Katz

Sheppard, N. SOME CHARACTERISTIC FREQUENCIES IN THE RAMAN SPECTRA OF SATURATED ALIPHATIC HYDROCARBONS. *J. Chem. Phys.* **16**, 690-697 (1948) *July.*

The characteristic frequencies of particular molecular groups in a hydrocarbon series either remain relatively constant or exhibit systematic changes in passing from one molecule to the next. From an examination of the tabulated literature of Raman frequencies, assignments for a number of the principal modes have been made for both straight and branched chain hydrocarbons.

S. Katz

Simard, G. L., Steger, J., Mariner, T., Salley, D. J. and William, V. Z. IN SITU STUDY OF THE THERMAL DECOMPOSITION OF ETHYLENE OXIDE BY INFRA-RED SPECTROMETRY. *J. Chem. Phys.* **16**, 836-837 (1948) *August.*

The use of a high temperature (410-470°C) absorption cell to follow the course of the thermal decomposition of ethylene oxide is described very briefly. The procedure appears to be a promising advance over existing techniques.

S. Katz

Thermodynamics

Edmister, W. C. APPLICATIONS OF THERMODYNAMICS TO HYDROCARBON PROCESSING. PART XII—GENERAL THERMODYNAMIC PROPERTIES. *Petroleum Refiner* 27, 104-111 (1948) *June.*

This installment continues the development of the generalized thermodynamic functions discussed in Part XI (*Gas Abstracts* 4, 164 (1948) *August*). The relations are used to derive the generalized thermodynamic properties for use with both single and multicomponent gaseous systems. Methods of making these derivations are illustrated in detail and the results, expressed in reduced P-V-T units, are presented in tabular form.

S. Katz

Sage, B. H., Olds, R. H. and Lacey, W. N. TWO GASEOUS MIXTURES CONTAINING HYDROGEN AND NITROGEN. *Ind. Eng. Chem.* 40, 1453-1464 (1948) *August.*

The thermodynamic properties of a mixture of hydrogen and nitrogen and a five-component mixture of hydrogen, nitrogen, carbon dioxide, carbon monoxide and methane were calculated at pressures up to 15,000 and 10,000 psia respectively at temperatures between 40° and 460°F. The thermodynamic properties were calculated from published volumetric data for the nitrogen-hydrogen mixture and from experimentally determined volumetric data for the five component mixture combined with spectroscopic information on the isobaric heat capacity of the components at infinite dilution, specific values of the volume, entropy, and enthalpy are recorded as functions of temperature and pressure throughout the intervals cited.

O. Bloomer

9. ORGANIC CHEMISTRY

Knock Characteristics

Frey, F. E., Kerley, R. V. and Lovell, W. G. KNOCK CHARACTERISTICS OF 16 PURE GASEOUS HYDROCARBONS. *Oil Gas J.* 47, 61, 63, 64, 67 (1948) *September* 2.

The knock tendencies of almost all of the gaseous hydrocarbons have been measured. The knock characteristics may be correlated with molecular structure. Thus, the paraffin gases show a fairly regular decrease in antiknock quality in going from methane to pentane. Due to its branched chain structure, isobutane has better antiknock properties than normal butane. Gaseous olefins with double bond in the 1-position show a decrease in value with increase in chain length, with the exception of ethylene which is lower than propylene. Cyclopropane, 1-butyne, 2-butyne, 1,3-butadiene and 1,2-butadiene were also rated. The blending octane numbers and the effectiveness of tetraethyl lead for various hydrocarbon gases are tabulated.

C. H. Riesz

Fluidization

Leva, M., Grummer, M., Weintraub, M. and Pollchik, M. FLUIDIZATION OF SOLID NONVESICULAR PARTICLES. *Chem. Eng. Progress* 44, 619-626 (1948) *August.*

In the second paper of a series on fluidization a general correlation is developed to predict the point of incipient fluidization. It was found that a certain minimum amount of bed expansion is necessary before fluidization can start. This condition of minimum fluid voidage was correlated with the effective particle diameter of the material and its shape, with the knowledge of the law of pressure-drop through packed beds and the minimum fluid voidage, the rate of gas flow for incipient fluidization may be predicted. A concept of fluidization efficiency was developed which may be used as a criterion for the quality of fluidization operations. Two sample problems are presented showing the application of the equations appearing in the article.

W. J. Merwin

Friction Losses

Vogt, E. G. and White, R. R. FRICTION IN THE FLOW OF SUSPENSIONS. *Ind. Eng. Chem.* 40, 1731-1738 (1948) *September.*

An attempt has been made to correlate data for friction losses attending pneumatic transportation of solids. An equation involving dimensionless groups is offered.

J. D. Parent

Heat Transfer

Bonilla, C. F. and Eisenberg, A. A. HEAT TRANSFER TO BOILING STYRENE AND BUTADIENE AND THEIR MIXTURES WITH WATER. *Ind. Eng. Chem.* 40, 1113-1122 (1948) *June.*

Tests were carried out by the authors for styrene-water and butadiene-water mixtures of various compositions boiling on a horizontal plate. For the same heat flux density, q/A, the Δt across the boiling film was higher for the mixtures than for either pure component. The degree of superheating was higher as less water was present. Critical boiling rates were found for styrene-water mixtures, below which complete mixing did not occur and the results obtained were virtually the same as those for pure water. Thus for mixtures of insoluble liquids, boiling of the denser phase may not take place until high heat transfer rates are reached if this phase has the higher boiling point. At low boiling rates the lighter liquid will not mix sufficiently to be carried down to the heating surface.

R. T. Ellington

Knowles, J. W. HEAT TRANSFER WITH SURFACE BOILING. *Can. J. Research* 26, 268-278 (1948) *July.*

The authors obtained experimental data for heat transfer to water flowing in an annulus from an inner heating tube. The bulk temperature of the water was below the boiling point and the surface temperature of the transfer tube went to about 100°C above the boiling point. Water velocities ranged up to 10 ft per sec and heat fluxes up to 720 watts per sq cm. They show that for normal boiling, heat transfer conditions can be correlated with the Dittus-Boetter equation if account is taken of the variation of the equation coefficient with the heat flux and length-diameter ratio.

R. T. Ellington

Liquid Extraction

Scheibel, E. G. FRACTIONAL LIQUID EXTRACTION. PART I. *Chem. Eng. Progress* 44, 681-690 (1948) *September.*

A new type of liquid extraction column, consisting of alternate mixing and calming sections, has been studied. Each mixing zone contains an agitator mounted on a centrally located shaft. The calming section consists of woven wire mesh. The column was 1 in. in diameter and the effective height 33 inches. The separation of ortho and para chloronitrobenzenes using Skellysolve and methanol containing 15% water as the two solvents, is the basis for the present study. Calculations using ideal systems are described. Heights of packed sections were ½, 1, 2, and 2½ inches, and those of mixing sections ½, ⅜ and 1 in. Increased agitator speed was found to give increased stage efficiency in the higher packed sections. The most important effect on stage efficiency, defined as theoretical stages equivalent to an actual stage, was packing height. The optimum packing height for this system was found to be 2 inches and the minimum height equivalent to a theoretical stage 2.2 inches. The process of fractional liquid extraction is analogous to fractional distillation. In the former, selection of solvents can be made according to the degree of preference of the components to be separated. Since in distillation there is little selectivity in the vapor phase, the use of two preferentially selective liquids can give a much greater separation in a single equilibrium contact.

C. L. Tsaros

Mechanical Mixing

Lyons, E. J. PRACTICAL MIXER TECHNOLOGY. *Chem. Eng. Progress* 44, 341-346 (1948) *May.*

The circulation patterns obtained both with and without baffles by the use of six basic types of agitators—paddles, turbines, propellers, cones, radial propellers and high speed disks—are discussed. Various methods of baffling are discussed. The approximate useful limits of the basic agitator groups are given.

B. E. Hunt

Serner, H. E. APPLICATION AND DESIGN OF MIXING EQUIPMENT. *Chem. Eng.* 55, 118-121 (1948) *August.*

Three basic types of agitators—paddles, turbines, and propellers—and other types such as homogenizers and dish agitators are discussed as to their advantages, disadvantages, and most suitable applications. By the use of formulas and graphs presented here and a procedure outlined in a previous article (Simplified Approach to Mixing Problems, H. E. Serner, *Chem. Eng.* 55, 127 (1948) *January*) the horsepower and time required for mixing may be calculated.

B. E. Hunt

Vacuum Distillation

Blaize, R. N. VACUUM DISTILLATION EQUIPMENT. *Petroleum Refiner* 27, 108-110 (1948) *September.*

Very useful generalizations on design of vacuum distillation equipment are offered. Several helpful sketches are included.

J. D. Parent

11. PROCESS EQUIPMENT AND INSTRUMENTATION

Electronic Circuit

Lutz, B. C. and Wood, J. H. A HIGH TEMPERATURE CONTROL CIRCUIT. *Can. J. Research* 26, Sec. A, 145-148 (1948) *May.*

A description and wiring diagram are given for an electronic circuit which is used to control electric furnaces having a long time lag.

W. J. Merwin

Flange Design

Lonngren, H. E. FURTHER FLANGE CONSIDERATIONS. *Petroleum Refiner* 27, 105-108 (1948) *July.*

This is a continuation of the treatment of flange design calculations (see *Gas Abstracts* 4, 116 (1948) *June*). A design chart which is typical for integral flanges with straight hubs is presented. A treatment of flanges for obround manheads is also included.

O. Bloomer

12. MATERIALS OF CONSTRUCTION

Corrosion

Lotz, P. L. THE ROLE OF PAINT IN COMBATING CORROSION IN THE PETROLEUM INDUSTRY. *Calif. Oil World* 41, 13, 15 (1948) *August,* 2nd issue.

Primer paint may either seal off moisture or by inhibitive pigments may alter the corrosive material and prevent corrosion. For the former, linseed oil with its good penetrating properties proved effective. The author also mentions a few inhibitive pigments. For severe corrosion due to special chemicals, a few of the plastic type coatings that appear promising are mentioned.

S. Mori

MANAGEMENT INFORMATION ON CATHODIC PROTECTION OF BURIED METALLIC STRUCTURES AGAINST CORROSION. *Corrosion* 4, 3-5 (1948) *September.*

This article is the first of a series of papers presented by the Correlating Committee on Cathodic Protection, and it gives a brief and general description of the nature of galvanic corrosion and the mechanism of cathodic protection.

S. Mori

Insulation

White, J. F. LOW TEMPERATURE INSULATION. *Chem. Eng. Progress* 44, 647-650 (1948) *August.*

The investigation of low-temperature insulation has been pressed because of the interest in tonnage oxygen plants. Methods of determining economic insulation with regard to thermal conductivity, cost of insulation, refrigeration cost, condensation prevention, and tolerable heat losses are presented. The authors discuss some of the new techniques in elastic foamed insulations, evacuated spaces, and gas-absorptive insulations in reduced pressure spaces.

R. T. Ellington

The following article, which has not been abstracted, is called to your attention:

Peifer, N. P. and Costanzo, F. E. MEASUREMENT OF GALVANIC CURRENTS AROUND AN UNDERGROUND STRUCTURE. *Corrosion and Materials Protec.* 5, 4-14 (1948) *July-August.*

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